

WHAT IS CLAIMED IS:

5

Sub  
a3

10

1. A module comprising:  
a semiconductor device;  
a phase adjustment circuit generating a  
second clock so that a phase adjustment signal  
output from the semiconductor device and a first  
clock have a predetermined phase relationship; and  
an output circuit that is provided in the  
semiconductor device and generates the phase  
adjustment signal from the second clock.

15

2. The module as claimed in claim 1,  
wherein the semiconductor device comprises an output  
buffer from which data is output in synchronism with  
the second clock.

25

Sub  
a4

30

35

3. A module comprising:  
semiconductor devices;  
a phase adjustment circuit generating a  
second clock so that a phase adjustment signal  
output from a first semiconductor device that is one  
of the semiconductor devices and a first clock have  
a predetermined phase relationship, the second clock  
being supplied to the semiconductor devices; and  
a wiring board on which the semiconductor  
devices and the phase adjustment circuit are mounted,  
the first semiconductor device including

5

15

25

35

# Deborah

5

10

20

30

35

12. The module as claimed in claim 6,  
wherein the first and second data lines have a  
substantially identical delay amount.

5

13. The module as claimed in claim 5,  
wherein the first and second data lines have a  
10 length that allows their delay amounts to be  
negligible.

15

14. The module as claimed in claim 6,  
wherein the first and second data lines have a  
length that allows their delay amounts to be  
negligible.

20

15. The module as claimed in claim 3,  
25 further comprising a terminal that is provided on  
the wiring board and is used to output the phase  
adjustment signal to an outside of the module.

30

16. The module as claimed in claim 3,  
wherein the first semiconductor device generates the  
phase adjustment signal in accordance with a  
35 predetermined signal given from an outside of the  
first semiconductor device.

FOUO 90-22072860

17. The module as claimed in claim 3,  
wherein:

the semiconductor devices including the  
first semiconductor device have an identical circuit  
configuration; and

the first semiconductor device has an  
output circuit that receives an external instruction  
that instructs the first semiconductor device to  
generate the phase adjustment signal.

10

18. The module as claimed in claim 3,  
wherein the first clock is supplied from an outside  
of the module.

20

19. The module as claimed in claim 3,  
further comprising a circuit generating the first  
clock from an external clock.

25

20. The module as claimed in claim 3,  
wherein each of the semiconductor devices comprises  
a programmable delay circuit that delays the second  
clock.

35

21. The module as claimed in claim 3,  
wherein the semiconductor devices comprise  
semiconductor memory devices.

09874037 060604  
1009090 22042860

Sub  
as

22. The module as claimed in claim 3, wherein the phase adjustment circuit generates the second clock from dummy output data output by the first semiconductor device.

5

23. The module as claimed in claim 3, further comprising a second phase adjustment circuit generating a third clock so that the third clock and the first clock have a predetermined phase relationship, the third clock being supplied to the semiconductor devices.

10  
15

24. The module as claimed in claim 23, wherein the first clock corresponds to the third clock.

20

25

25. A system comprising:  
modules;

a wiring board on which the modules are mounted; and

a dummy output load line serving as loads of dummy output data output from the modules.

30

26. The system as claimed in claim 25, wherein the dummy output load line is provided in common to the modules.

35

1050950 2E072850

Sub  
ae

27. The system as claimed in claim 25, wherein the dummy output load line comprises parts respectively provided to the modules.

5

28. The system as claimed in claim 25, wherein the modules comprises a module including:  
10 semiconductor devices;  
a phase adjustment circuit generating a second clock so that a phase adjustment signal output from a first semiconductor device that is one of the semiconductor devices and a first clock have  
15 a predetermined phase relationship, the second clock being supplied to the semiconductor devices; and  
a wiring board on which the semiconductor devices and the phase adjustment circuit are mounted,  
the first semiconductor device including  
20 an output circuit generating the phase adjustment signal from the second clock.

25

29. A semiconductor device comprising:  
a first buffer receiving a first external clock and generating a first internal clock therefrom;  
30 a second buffer receiving a second external clock and generating a second internal clock therefrom;  
an input buffer fetching input data in synchronism with the first internal clock;  
35 an output buffer from which data is output in synchronism with the second internal clock; and  
an output circuit outputting dummy output

5

10

15

20

30